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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/845,454	04/30/2001	Bharath Rangarajan	F0662	3018

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EXAMINER

TRAN, BINH X

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 04/08/2003

4

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/845,454

Applicant(s)

RANGARAJAN ET AL.

Examiner

Binh X Tran

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1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 2-21-2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 13-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 25 is/are rejected.
- 7) ☐ Claim(s) 10-12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group I in Paper No. 3 is acknowledged. In the previous office action, the examiner was unsure whether claims 19-22 belong to group I (apparatus) or group II (method) because they contained an error in the preamble. In the election filed on 2-21-2003, applicants indicated that applicants would amend these claims (19-22) so that they reflect a method claim and belong to group II. Therefore, group I contains claims 1-12 and 25. The applicants made an election of Group I (claim 1-12, 25) with traverse. However, applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Objections

2. Claim 4 is objected to because of the following informalities:

In claim 4 the applicants use the short hand abbreviation "PR" and "BARC". The examiner suggests the applicants disclose what "PR" and "BARC" stand for in the claim to avoid any confusion. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Eroguchi et al. (US 6,113,733) in view of Su (US 6,486,492).

Eriguchi discloses a system for monitoring and regulating etch process comprising:

at least one etching component (i.e. gas inlet 609 or heater 604) operative to etch at least one portion of a wafer (103) (Fig 18);

an etch component driving system (608, control flow meter; or heater) for driving the at least on etching component;

a system (611, Xe lamp) for directing light (618) toward one or more gratings located on at least one portion of the wafer (Fig 18, Fig 30);

an etch monitor system (613) operate to measure one or more etching parameters from the light reflected from the one or more gratings (Fig 18, col. 37 lines 45-55);

a computer (615) (read on "processor") operatively coupled to the etch monitoring system (613) and the etch component driving system (608), wherein the computer receives an etching parameter data from the measuring system (613) and analyzes the etching parameter (Fig 18).

Eriguchi also discloses that the computer analyzes the etching parameter by comparing the etching parameter data to stored etching data (i.e. initial value) to generate a control date to control with the etching component (Fig 1). Eriguchi fails to disclose that the control is a feed-forward control data. In a system for monitoring etching process, Su discloses that the control is a feed-forward control data to control

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the etching component (abstract). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Eriguchi in view of Su by using a feed-forward control data because it will improve critical dimension during the etching process.

5. Claims 2-6, 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eriguchi and Su as applied to claim 1 above, and further in view of Xu et al. (US 6,483,580).

Respect to claim 2, Eriguchi and Su fail to disclose the use of scatterometry system. However, Eriguchi clearly discloses the use of ellipsometric system for processing the light reflected from the one or more grating (col. 9 lines 25-50). In a semiconductor method, Xu discloses the use of scatterometry system to obtain an ellipsometric signature. It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Eriguchi and Su in view of Xu by using the scatterometry system because equivalent and substitution of one for the would produce an expected result.

Respect to claim 3, Eriguchi discloses that the computer coupled to the spectroscope, the computer analyzes data received from the spectroscope and produces an analyzed date (Fig 11, 18, col. 37). Eriguchi further discloses the computer control the etching component (i.e. gas inlet or temperature) via the etching component driving system (heater or flow rate control meter). The limitation regarding scatterometry system has been discussed above.

Respect to claim 4, Eriguchi discloses the etch process is the main etching (Fig 1). Respect to claim 5, Eriguchi discloses the etch process is an anisotropic etch process (Fig 2a-2c). Respect to claims 6 and 8, Eriguchi discloses the mechanism of the etch process is a chemical basis such as plasma etching technique (abstract).

6. Claims 7, 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eriguchi, Su and Xu further in view of Ko et al. (US 6,117,791).

Respect to claims 7, 9, Eriguchi discloses the dry etching process is a plasma etching process or a sputtering etching (col. 33 lines 57-61). However, Eriguchi fails to disclose specifically that the dry etching is one of reactive ion etching or glow discharge sputtering. Ko discloses that the dry etching including RIE and glow discharge sputtering (col. 2 lines 8-22). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Eriguchi, Su, and Xu in view of Ko by using either RIE or glow discharge sputtering because these techniques are capable of accurately reproducing the features of a protective mask.

7. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jahns (US 5,711,843) in view of Su and further in view of Xu.

Jahns discloses a system for monitoring the etching process comprising:
a spectrometer with a detector array for sensing the acceptability of etching in at least one of the grid blocks of the wafer (Fig 7);
means for controlling (controller 707) the etching of a wafer portion (Fig 7);
means for selectively controlling (computer 706) the means for etching (Fig 7, col 11 lines 30-61)

Jahns discloses a spectrometer with a detector for sensing the acceptability of the etching. However, Jahns fails to specify that the spectrometer is scatterometry. Xu discloses a spectroscopic scatterometer. It would have been obvious to one having ordinary skill in the art, at the time of invention to modify Jahns in view of Xu by using a scatterometry means because equivalent and substitution of one for the other would produce an expected result.

Jahns also fails to disclose means for partitioning a wafer into one or more grid block. Su disclose a means for partitioning a wafer into one or more grid block (col. 5 lines 6-18, Fig 1). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Jahns and Xu in view of Su by including a means for portioning a wafer into one or more grid because allow multiple patterns on the wafer.

Allowable Subject Matter

8. Claims 10-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The cited prior arts fail to disclose or suggest that the processor logically mapping the wafer into one or more grid blocks and making a determination of the acceptability of etching values in the one or more grid blocks in conjunction with other limitation in the claims.

Conclusion

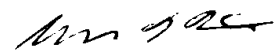
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9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X Tran whose telephone number is (703) 308-1867. The examiner can normally be reached on Monday-Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Binh X. Tran
April 4, 2003


BENJAMIN L. UTECH
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